

Scanlock Technical Description



Receiver section

Scanlock is a wide band radio receiver with two modes of operation. In automatic mode it will tune to the strongest signal received, and in manual mode it provides rapid tuning across the entire bandwidth.

This is achieved by using techniques similar to those used in a superheterodyne receiver, but using a large number of harmonically related local oscillator signals, rather than the single local oscillator frequency used in a conventional receiver. This enables Scanlock to monitor a large number of frequencies simultaneously while still giving good selectivity.

The incoming signals are mixed with the local oscillator frequencies in a broadband diode mixer. The local oscillator is voltage controlled with a fundamental of 10–20MHz and harmonics up to 4GHz. The output of the mixer is fed to a 10MHz low-pass filter. It can be shown that any frequency in the reception bandwidth of Scanlock will produce at least one mixer product in a bandwidth of 0–10MHz, with higher frequencies producing more mixer products.

This band-limited signal is amplified and fed to a 2MHz phase detector, which produces an error voltage corresponding to the frequency difference between the strongest input frequency and 2MHz. In automatic mode this error voltage is used to control the local oscillator to tune this signal to 2MHz. In manual mode the local oscillator is controlled by a voltage from the manual tuning potentiometer on the front panel.

The input signal is thus converted to an intermediate frequency of 2MHz, which is band-limited, amplified and demodulated, using AM, FM and sub-carrier detectors. The sub-carrier detector will demodulate any signals which are frequency modulated

onto an ultrasonic carrier before being used to modulate the RF signal. This form of double FM can be used to make a monitoring transmitter sound as if its carrier is unmodulated when received on a conventional FM receiver. There is a 2MHz IF output socket on the front panel to enable connection to a display unit to enable detailed signal examination.

This reception system has some important advantages:

- In automatic mode, Scanlock will lock to the strongest local transmitter. If you are close to a bugging transmitter, even if it is very low power, its signal strength will be stronger than more powerful legitimate transmitters which are further away. Scanlock will lock to a signal in under 0.5 second, which makes this mode extremely fast.
- The entire band from 10MHz to 4GHz can be tuned through much more rapidly using this method than using conventional reception techniques, minimising the time taken to 'sweep' an area clear of unauthorised transmitters.
- The digital display on the front panel is a measure of the local oscillator control voltage, and gives a reference which enables a particular signal to be quickly tuned to.
- For a receiver where a large number of frequencies are monitored simultaneously the sensitivity of Scanlock in the manual tuning mode is close to the theoretical limit. Scanlock has been optimised to provide rapid search facilities with a sensitivity more than adequate for its application, while being compact and portable.

Signal Processing

Scanlock has several features to distinguish a radio-microphone from a legitimate transmitter and then locate it:

1. Direct listening. One can monitor on headphones, or using the built-in speaker, the output of the AM, FM or sub-carrier demodulators, to identify the transmission source.
2. Soundwave. In this mode, a tone is emitted from the loudspeaker at approximately 2KHz. If a radio-microphone is within listening distance it will pick up and transmit this tone. Scanlock filters the audio signal from all three IF demodulators and checks for the presence of 2KHz tone. If it is detected the operator is alerted. The performance of this circuit has been optimised to give good sensitivity with a fast acquisition time, to enable the user to manually tune Scanlock through the band quickly, yet still detect radio-microphones reliably.
3. Location. A bargraph display indicates the received signal strength. In addition, the field strength voltage is used to control

an audio oscillator, whose pitch increases with field strength. When in Locate mode, this provides the operator with an easy means of maximising the field strength, and hence locating the transmitter.

4. Squelch control. A front panel potentiometer sets the squelch threshold. This is a carrier squelch; i.e. if the received signal strength exceeds the threshold, the audio amplifier is turned on, and a remote alarm can be activated via the relay closure socket on the front panel.

5. Scanlock has built-in a mains carrier receiver circuit. When the unit is plugged in to the mains, signals can be detected which are up to 250KHz in carrier frequency and are frequency modulated. The soundwave technique described above can also be used in this mode. There is no signal strength indication in this mode, as this would not give a useful aid to the location of the transmitter due to the closed transmission path.

AUDIOTEL

Audiotel International Ltd.,
Cavendish Courtyard, Sallow Road,
Weldon, Corby NN17 1DZ, England.
Telephone (0536) 66677. Telex 341775 AUDINT. Fax (0536) 66711.

Audiotel International are manufacturers of electronic security equipment used by Government and commercial organisations throughout the world.

® Scanlock is a registered trademark of Audiotel International Ltd.

© Audiotel International. All rights reserved. All specifications through product improvement may be changed without notice.

AUDIOTEL

Audiotel International Ltd.

SCANLOCK 2000

Your business is private and confidential, make sure it stays that way.

Protection of the written word is standard procedure in all offices, but the most serious and growing threat is from illicit eavesdropping on the spoken word.

Scanlock 2000 is the most effective counter-surveillance device against the threat of hidden radio microphones. Such bugging devices can be bought from around £10, small in size, readily available and simply placed, they are a real threat to security. It's not surprising that everyday someone's secrets become someone else's property.

Scanlock 2000 detects and locates such devices in use. It is simple and effective to operate.

Scanlock automatically monitors the wide radio spectrum and will quickly detect and locate any radio microphone.

Scanlock is not limited to detecting standard radio microphones. Its superior capabilities enable it to detect the more sophisticated Scrambler microphones, and other non audio surveillance devices, used for instance against computer installations, which would normally defeat other detection systems.

Scanlock 2000 can be left on guard for continuous real time protection in any sensitive area and will give an immediate alarm if a radio transmitter is activated. It also detects microphones that use standard mains cables for power and transmission.

Scanlock 2000 is fully portable, discreet, mains or battery operated and backed by a two year manufacturer's guarantee.



SCANLOCK 2000

SPECIFICATIONS

RADIO TRANSMITTER DETECTOR

Bandwidth	10MHz to 4GHz
Sensitivity	Automatic, better than - 60dBm to 1.8GHz, falling to - 15dBm at 4GHz Manual, better than - 80dBm to 1.8GHz
Demodulation	Separate AM, FM, SC (Sub- carrier 20KHz to 130KHz) demodulators

CURRENT CARRIER DETECTOR

Sensitivity	10mV
Demodulation	FM, 25KHz to 260KHz

OUTPUTS

Audio	Internal loudspeaker, headphone socket
Recorder	100mV (for 50% AM)
I.F.	2MHz, 150mV
Lock Remote	Relay contacts rated at 1.0A, 30VDC

CONTROLS

Momentary-contact switches with integral LEDs for all functions. Rotary controls for Volume, Manual Tune, Squelch.

DISPLAYS

12 segment LED for field strength, with 90dB dynamic range. 3 1/2 digit LCD for signal tuning reference.

POWER

Mains	110/120, 220/240 VAC, 50/60Hz
Battery	Removable 1.2Ah rechargeable Nicad pack. Integral charger in unit.

STANDARD ACCESSORIES

Carrying Case
Antenna
Antenna extension lead
Remote Alarm
2 Nicad rechargeable batteries
Mains lead
Shoulder strap
Headphones
Spare fuse kit
Operating and Applications
manual

DIMENSIONS

Size	Basic unit 320 x 230 x 80 (mm) With case 350 x 285 x 160 Shipping 450 x 350 x 250
Weight	Basic unit 5Kg With case 9Kg Shipping 11Kg